Technologies to Enable EDL of Smallsat Science and Exploration Payloads

Completed Technology Project (2015 - 2019)

Project Introduction

The central objective of this research is to develop technologies for Entry, Descent, and Landing (EDL) of cubesat-sized vehicles. While current efforts tend toward landing larger masses, smaller payloads may fulfill scientific and exploration objectives for a fraction of the cost. Difficulties with scalability of existing technologies must be confronted. Previous technology deemed infeasible for larger systems can be considered for low mass architectures. Passive landing systems such as rough landers, for example, are especially appealing due to their lack of required inertial and range sensing close to the surface. The second key aspect of this research is to identify applicability of these systems to a range of missions. This may encompass payload sensitivity to heat and g loads, the landing precision requirements, time requirements, and many more. The primary means of approaching this problem will be a systems-level trade study of several technologies, from conceptual to flight proven. The trade space must include trajectory limitations and vehicle size constraints. Following the conceptual design phase will be experimental testing of selected EDL technologies suitable for smallsat EDL. This work supports NASA's long term goals and interests. Maturation of smallsat technology will provide a more accessible platform for scientific objectives requiring atmospheric entry, such as university sponsored projects. In addition, a low cost and proven means of flight testing small-scale novel EDL concepts will emerge from this research.

Anticipated Benefits

This work supports NASA's long term goals and interests. Maturation of smallsat technology will provide a more accessible platform for scientific objectives requiring atmospheric entry, such as university sponsored projects. In addition, a low cost and proven means of flight testing small-scale novel EDL concepts will emerge from this research.

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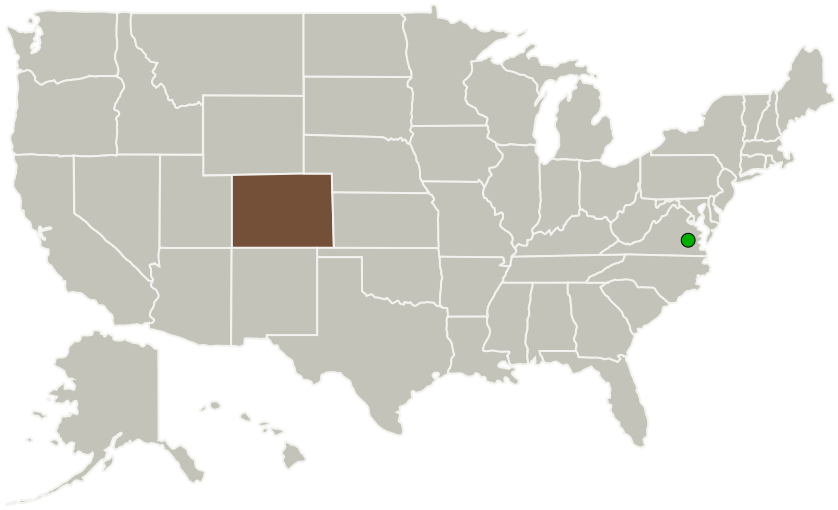
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
University of Colorado Boulder	Lead Organization	Academia	Boulder, Colorado
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations
Colorado

Project Website:

https://www.nasa.gov/strg#.VQb6T0jJzyE

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

University of Colorado Boulder

Responsible Program:

Space Technology Research Grants

Project Management

Program Director:

Claudia M Meyer

Program Manager:

Hung D Nguyen

Principal Investigator:

Robert D Braun

Co-Investigator:

Casey Heidrich

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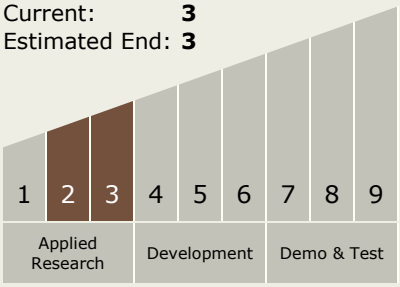
Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.2 Descent
    - TX09.2.1 Aerodynamic Decelerators

Target Destinations

The Sun, Earth, The Moon